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IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF	:
JUNICHI ARAMI	: EXAMINER: EGGERDING, MATTHEW THOMAS
SERIAL NO: 10/561,017	:
FILED: DECEMBER 16, 2005	: GROUP ART UNIT: 1763
FOR: HEAT TREATMENT APPARATUS	:

INTERVIEW AGENDA: DO NOT ENTER

COMMISSIONER FOR PATENTS
ALEXANDRIA, VIRGINIA 22313

SIR:

Dear Examiner Eggerding:

Please call me at (703) 412-7033 to set a time this week for an interview for this case. Included here are unofficial comments about the outstanding rejections. I would like an opportunity to better understand your position on these matters after you review the enclosed comments.

Ron Rudder

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Application No. 10/561,017
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COMMENTS

In the outstanding Office Action, Claims 4, 6-8, 14, and 15 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Arami et al (U.S. Pat. No. 5,904,872) in view of Toya et al (U.S. Pat. No. 6,407,371). Claim 5 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Arami et al and Toya et al and further in view of Goela et al (U.S. Pat. No. 5,612,132). Claims 9-13 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Arami et al in view of Saito et al (U.S. Pat. No. 6,369,361). Claim 10 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Saito et al in view of Arami et al.

Claim 4 recites:

> 4. A mounting table, comprising:
>
> a heating unit including a reflector plate made of an opaque quartz, and a quartz tube ***welded to a surface of the reflector plate,*** wherein a carbon wire which generates heat when a current is applied thereto is inserted in the quartz tube; and
>
> a mounting table cover member installed to cover the whole quartz tube of the heating unit, a target object being mounted thereon, wherein the mounting table cover member is made of a light absorbing material.

Claim 6 recites:

> 6. A heat treatment apparatus, comprising:
>
> a mounting table including a heating unit having a reflector plate made of an opaque quartz, and a quartz tube ***welded to a surface of the reflector plate***, wherein a carbon wire which generates heat when a current is applied thereto is inserted in the quartz tube; and a mounting table cover member installed to cover the whole quartz tube of the heating unit, a target object being mounted thereon, wherein the mounting table cover member is made of a light absorbing material;
>
> a processing chamber accommodating therein the mounting table;
>
> a gas supply unit for supplying a gas in the processing chamber; and

a vacuum pumping system for evacuating the processing chamber.

Claim 9 recites:

9. A heat treatment apparatus, comprising:
a mounting table on which a target object is mounted;
a processing chamber accommodating therein the mounting table;
a gas supply unit for supplying a gas in the processing chamber;
a vacuum pumping system for evacuating the inside of the processing chamber;
a target object heating unit for heating the target object;
an inner vessel installed in the processing chamber;
a heating unit, installed between the inner vessel and an inner wall of the processing chamber, for heating the inner vessel,
wherein the inner vessel is made of a light absorbing material, and
the heating unit includes a reflector plate made of an opaque quartz, and ***a quartz tube welded to a surface of the reflector plate***, a carbon wire which generates heat when a current is applied thereto being inserted in the quartz tube.

In a conventional mounting table including a heating unit, planar quartz surfaces are required to be thermally bonded together in order to encapsulate the whole heater inside the quartz plates and/or the quartz cases. In this case, quartz needs to be machined with good flatness. That is, the surface processing of quartz needs to be carried out with high accuracy. Such a process, however, is very difficult, and the apparatus itself becomes costly. Compared with the conventional mounting table, Applicant provides a mounting table which can be manufactured relatively easily and inexpensively by way of the claimed welding of the quartz tube to the surface of the reflector plate, into which a carbon wire is inserted..

Arami et al only describe a mounting table. Specifically, Arami et al describe as follows (see col. 5 lines 10 to 52).

1) A groove 15 corresponding to the heating element pattern and having a predetermined depth is formed in the lower surface of the heating plate 11. Further, during formation of the groove 15, through holes 16 and 17 vertically extending through the heating plate 11 are formed in the groove 15 portions of the extended portions 13 and 14 (Figs. 4-5).

2) Then, a paste 31a for forming the heating element 31, for example, a platinum paste is filled in the groove 15 corresponding to the heating device pattern. In addition, the paste 31a is filled in the through holes 16 and 17 (Fig. 6).

3) After the paste 31a is filled, the heating plate 11 is burned to evaporate a solvent or the like in the paste 31a, and the paste 11 is sintered to obtain a heating element 31.

4) After the burning, the upper and lower surfaces of the heating plate 11 are ground by, for example, a surface grinding machine or the like and polished to remove an unnecessary heating element 31, thereby increasing the degree of flatness.

5) Reflecting plate 21 which is prepared in advance and has surfaces machined to a predetermined degree of flatness is brought into tight contact with the lower surface of the heating plate 11, and the resultant structure is heated to about 1,200℃. In this state, the structure is pressed to join the heating plate 11 and the reflecting plate 21 to each other by welding.

That is, Arami et al describe a mounting table in which a heating plate having sintered paste 31a which generates heat is directly welded to the reflecting plate.

Further, Toya et al describe a heating unit as follows. (See col. 16, lines 28-42)

1) A first flat quartz glass plate 31 and a second flat quartz glass plate 32 having hairpin-shaped grooves 32a in which the carbon wire heating element is accommodated are put one over the other as shown in FIG. 13b.

2) The first and the second flat quartz glass plate are fused to each other such that the carbon wire heating element 2 is sealed into an integral member.

3) Small diameter quartz glass tube 3a and 3b are secured to the opposite ends of said carbon wire heating element 2 by means of the wire carbon members A.

4) Sealed terminal section 10 (20) having the pinch sealed tungsten connection lines 22a and 22b is also fusion-connected to form an elongated plate-like rod-shaped heater which is planar.

The outstanding Office Action asserts that Figs. 13 and 14 of Toya et al disclose that a quartz tube is welded to a surface of the reflector plate. However, as can be seen from the above, Figs. 13 and 14 of Toya et al only describe a heating unit itself, and do not teach, or even suggest that a quartz tube is welded to the surface of a reflector plate.

Moreover, Saito describes that chamber wall 3 serves as both a chamber wall and reflector plate. See Figs 1 and col. 4, lines 62 to col. 5, lines 5. In this case, chamber wall 3 is made of aluminum. That is, Saito does not teach or even suggest that a quartz tube is welded to the surface of the reflector plate made of quartz. Generally, welding a quartz tube to a quartz plate is completely different from welding a quartz tube to a metal plate like aluminum. Further, the present invention can provide a mounting table which can be manufactured relatively easily and inexpensively by welding a quartz tube, into which a carbon wire is inserted, to a surface of the reflector plate made of quartz. Accordingly,

teachings of Saito are completely different from that claimed with respect to the welded structure.

Further, Goela (US 5,612,132), Takahashi (US 6,254,687) and Tay (US 2003/0094446) does not alleviate the above deficiency of Arami, Toya, and Saito.